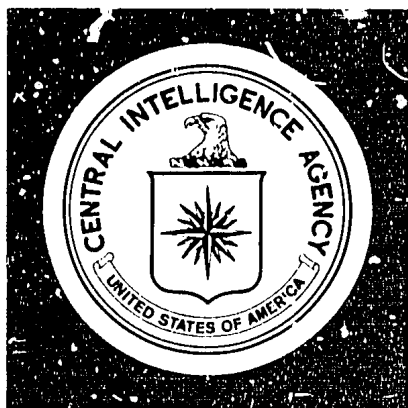


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**Secret**



# Intelligence Report

## *China's Industrial Plant Import Program*

**Secret**

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**China's Industrial Plant  
Import Program**

**KEY FINDINGS**

Since the end of the Cultural Revolution (1966-69), China has engaged in a massive program to import industrial plants and technology from non-Communist countries. Negotiations currently under way with Western companies indicate that Peking will continue to rely heavily on imported plants to develop a modern industrial base.

*Value of plant purchases* -- China has signed contracts during the 1970s for about 110 plants, worth \$2.2 billion. This level of purchases is more than six times greater than the value of plants imported from the West during the decade of the 1960s.

*Types of plants purchased* -- Imported plants are intended to boost sharply output of essential consumer goods such as synthetic fibers and foods and such key industrial products as finished steel and electricity.

*Primary suppliers* -- Japan and Western Europe are supplying 90% of China's imported plants, followed by the United States with about 10%. American companies, however, are receiving considerable royalty payments for US-developed technology embodied in Japanese and European plants sold to China.

*A flood of technicians* -- More than 3,000 foreign technicians will help the Chinese erect imported plants. This total represents the largest group of foreigners permitted to reside in China since the Soviets withdrew in 1960. At the same time, most of the 1,000 Chinese personnel scheduled to go have been sent abroad to receive technical training to operate the plants.

*Construction status* -- Most imported plants are on schedule. Two of four petrochemical complexes will begin operations in early 1976, four steel mills will be completed in 1977, and the remainder of imported plants will probably be in operation by the end of 1978 as planned.

Note: Comments and queries regarding this report are welcomed. They may be directed to [redacted] of the Office of Economic Research, [redacted]

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*Locations of imported plants* – China is grouping most imported plants in complexes near existing industrial centers. All chemical plants will be located in four complexes, and the steel mills are under construction at Wu-han. Fertilizer plants are going up in various gas and oil fields near major agricultural regions.

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## DISCUSSION

### Background

1. The Chinese have purchased numerous complete plants and major additions to existing plants from non-Communist countries since the termination of Soviet aid in 1960. These purchases have occurred in two waves and have consisted mainly of facilities for the petrochemical and metallurgical industries. Imported plants are intended to produce such products as synthetic fibers, urea fertilizer, plastics, and special steel products that China could not previously produce in large quantity.

2. The first wave of purchases occurred in 1963-66, when the Chinese contracted for about 60 plants and major additions worth \$200-\$300 million. Between late 1966 and 1968, during the turmoil of the Cultural Revolution, complete plant purchases almost ceased. Interest in imported plants gradually revived in late 1969 and 1970, and negotiations were resumed with many foreign firms. The second phase of plant purchases from non-Communist countries picked up steam in 1971 and 1972 and has continued up to the present.

### Current Phase

3. The current wave of buying industrial plants was clearly signaled in November 1972, when Peking re-established the China National Technical Import Corporation (TECHIMPORT). This organization had functioned during 1963-65 as the purchaser of industrial plants and advanced technology but had been inactive since 1966 and was merged with another state trading corporation in early 1970. The recent wave of purchases also coincided with the establishment of full diplomatic relations with Japan in early 1972 and the opening of Sino-US relations following President Nixon's visit to China. Most of the major plant contracts signed during the past three years have been with Japanese firms; many involve US technology.

4. The peak year for ordering plants was 1973, when China signed 60 contracts, worth \$1,267 million.<sup>1</sup> The value of these purchases was nearly five times higher than the \$200-\$300 million worth of plants ordered from non-Communist suppliers during the decade of the 1960s. This rate of purchase

1. For a list of confirmed plant purchases for 1972-75, see Appendix A.

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exceeded China's ability to absorb the technology. In 1974 the number of contracts fell to 19 plants worth \$844 million, still a respectably high figure. Only \$31 million worth of new plant contracts were signed during the first half of 1975. The accompanying tabulation illustrates the rise and fall of Chinese plant purchases since the early 1960s.

Year Contract Signed	Number of Con- tracts	Estimated Value of Contracts (Million US \$)
<b>Total</b>	<b>180</b>	<b>2,428</b>
1963-67	60	210
1968-71	10	18
1972	23	58
1973	60	1,267
1974	19	844
1975 (Jan- Sep)	8	31

#### The Wave Pattern in Chinese Purchases

5. A pause in new purchases during 1975 was necessary to absorb industrial plants already ordered. Between 1972 and mid-1975, China contracted for about 110 plants worth \$2.2 billion. Because of China's limited administrative and technical talent, many of the same people are apparently involved in more than one plant contract as a negotiator or administrator. Moreover, imported plants embody advanced technology that can be absorbed only by extensive training for Chinese technicians in the country of origin. It is not surprising, therefore, that the level of new purchases in 1975 decreased sharply from the peak years of 1973-74. This pause in purchases also coincided with the completion of the five-year plan.

#### Types of Plants Purchased

6. The current plant import program emphasizes the petrochemical, fertilizer, and steel industries. More than three-fourths of the \$2.1 billion worth of plants ordered in 1973 and 1974 have gone to these three sectors. This total includes the largest single complete plant contract ever signed by China, a \$300 million petrochemical complex to be supplied by France. The following tabulation illustrates plant purchases, by industry:

Industry	Million US \$				
	1972	1973	1974	Jan-Sep 1975	Total
<b>Total</b>	<b>57.8</b>	<b>1,266.9</b>	<b>844.4</b>	<b>30.7</b>	<b>2,199.8</b>
Petrochemical	....	699.4	112.2	20.0	831.6
Ammonia-urea	....	391.8	120.0	....	511.8
Metallurgical	....	....	553.7	10.7	564.4
Electric power	23.4	163.1	58.5	....	245.0
Other	14.4	12.6	....	....	47.0

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*Petrochemical Plants*

7. Imported petrochemical complexes will produce synthetic fibers, plastics, and resins. The heavy investment in these areas shows China's intention to acquire foreign equipment and technology to help maintain a minimal standard of living for its huge population. When completed, the petrochemical complexes will greatly increase the output of synthetic fiber for clothing, thereby reducing the pressure to produce cotton and freeing additional land for food production.

*Ammonia-Urea Plants*

8. The inadequacies of the domestic fertilizer industry were highlighted by the poor harvest of 1972, which helped convince Chinese leaders that agriculture requires additional fertilizer and other inputs to cushion the effects of bad weather. One solution to China's food/population problem is to increase production of fertilizer, especially urea fertilizer with its high nitrogen content. Domestic shortages in technology, equipment, and stainless steel and a limited machine tool industry ruled out rapid increases by domestically designed fertilizer plants. Beginning in late 1972, therefore, China started to negotiate for 13 of the world's largest ammonia-urea plants from the United States, the Netherlands, France, and Japan. The cost of these fertilizer plants is about \$500 million, as illustrated in the following tabulation:

	Number of Plants	Type	Value (Million US \$)
<b>Total</b>			<b>511.8</b>
United States	8	Ammonia	205.0
Netherlands	3	Urea	89.0
France	3	Ammonia	120.0
	3	Urea	
Japan	2	Ammonia	84.8
	2	Urea	
Denmark	1	Ammonia catalyst	13.0

*Steel Mills*

9. In 1974 the Chinese purchased four major installations for the steel industry worth \$550.5 million. China bought a cold rolling mill and a continuous casting mill from West Germany and a hot strip mill and a silicon plate mill from Japan. Half of the output of the silicon plate mill is scheduled for the production of transformers to help China's electric power industry.

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### *Electric Power*

10. From September 1972 through 1974, China contracted for six electric powerplants worth \$240.3 million. Because these facilities require a long lead time for fabrication and erection, they will not all be operational before the majority of the other industrial plants being imported are on stream.

### *Other Plants*

11. Unlike the first wave of industrial plant purchases in the 1960s when China bought many prototype plants, only a few specialized plants have been bought during the 1970s. Included in this group are a motion picture film plant, a pulp mill, and three bearings plants. The bearings plants are intended to produce specialized bearings for the transportation industry; one plant will produce journal bearings for rail cars exclusively.

### **Impact of Imported Plants**

12. The new plants are large-scale production units and not prototypes that will be copied. When completed, the plants will:

- Boost output of the petrochemical industry tenfold. For example, ethylene production will increase from 50,000 metric tons in 1975 to about 580,000 tons in 1978.
- Increase synthetic fiber output fourfold.
- More than double China's annual nitrogen fertilizer capacity to 6.7 million tons of nutrient, up from the 1974 estimate of 3.2 million tons.
- Add more than 5.7 million tons of capacity to China's current level of 18-19 million tons of finished steel, a 30% increase in capacity.
- Add 1,280 megawatts (mw) to China's estimated 29,000 mw of electrical generating capacity and boost output in the highly industrialized areas in Northeast China.

### **Suppliers**

13. China prefers to contract with companies that provide the best combination of modern technology, low price, good financial terms, and fast

14. The Chinese are firm believers in spreading the business around. They learned from earlier experiences with the Soviets the dangers of dependence on one source. During the 1960s, for example, 30% of their complete plant business went to Japan, 25% to West Germany, 20% to the United Kingdom, and the remainder to other European countries. Many contracts, however, involved a consortium made up of firms from several countries. With the broadening of US-Chinese relations in the past two years, China has been able to diversify further its sources of supply. The following tabulation lists the suppliers of industrial plants since 1972:

	Total 1972-75 <sup>1</sup> (Million US \$)	Percent of Total
<b>Total</b>	<b>2,199.8</b>	<b>100.0</b>
Japan	853.9	38.8
France	598.3	27.2
West Germany	321.0	14.6
United States	205.0	9.3
Italy	103.8	4.7
Netherlands	89.0	4.1
Denmark	13.0	0.6
United Kingdom	8.3	0.4
Sweden	7.5	0.3

1. January-September 1975.

#### *Japan*

15. As the tabulation illustrates, almost 40% of China's plant purchases have come from Japan. The Japanese have natural competitive advantages in selling most types of plants to China, including considerable experience in dealing with the Chinese, favorable financing, low transportation costs, and formidable technological development. Japanese sales in 1973 totaled \$460.6 million, or just over 36% of China's total plant purchases that year. Japan's share of sales in 1974 was \$345.3 million, or 41% of the year's total. Japan is supplying petrochemical plants, two

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ammonia-urea complexes, and two large electric powerplants. The Japanese also have contracts for the hot strip and silicon plate mills and three bearings plants.

### *France*

16. France ranks behind Japan with total plant sales of \$598 million. The bulk of these sales covers two petrochemical complexes, one worth \$300 million and the other worth \$90 million. In 1974, French sales of \$184 million included three ammonia-urea complexes worth \$120 million and a huge coal-fired powerplant valued at \$54 million. The three chemical plants are being built by a French-led West European consortium that includes companies from Great Britain, West Germany, and other countries. A large portion of the ammonia-urea equipment is reportedly being fabricated in Japan and the United States.

### *West Germany*

17. West Germany sold only one small plant to China in 1973. This sale was an acetaldehyde plant, which will be part of the Shanghai petrochemical complex. In 1974, however, the West Germans signed contracts for steel mills worth about \$257 million and other plants worth \$39 million. West German firms were hesitant to bid on Chinese contracts in the early 1970s because of memories of the harsh treatment accorded some of their personnel during the Cultural Revolution. So far in 1975, the West Germans have sold one chemical plant reportedly worth \$20 million and one unidentified plant.

### *The American Connection*

18. China's only direct purchases from the United States during 1973 and 1974 were all from the M.W. Kellogg Co. and consisted of eight ammonia plants worth \$205 million. China, however, has made America a prime source of technology by purchasing plants from other nations that hold American patents, licensing arrangements, or technological agreements.<sup>2</sup> Total US earnings from the sale of industrial plants to China have amounted to perhaps \$250 million through payments for technology and equipment sold under license or royalty arrangements by other countries.

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2. For a list of industrial plants involving US technology, see Appendix B.

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### *Others*

19. Other non-Communist nations supplying China are Italy and the Netherlands. Italy will supply a polypropylene chemical plant and the largest powerplant purchased in recent years – an oil-fired 320-mw installation. The Netherlands' Kellogg Continental Company, which is 50% owned by M.W. Kellogg of America, is building eight other urea plants to use the output of the eight ammonia plants sold by the American firm. The urea plant contracts are worth \$89 million.

20. The remainder of the industrial plant sales by non-Communist countries in 1973 and 1974 totaled only \$28.8 million, about half of which went to Denmark for an ammonia catalyst plant. The United Kingdom sold an \$8.3 million film processing plant that has some potential military applications. Sweden has sold a ladle furnace plant for a steel mill, an anchor chain plant, and a pulp mill. Few details are available on the Swedish sales except that the ladle furnace and pulp mill together cost \$7.5 million.

### **Financing**

21. The Chinese have been able to purchase foreign plants because they have swallowed their ideological aversion to foreign debt and are accepting medium-term deferred payment to finance many purchases. Foreign suppliers have been willing to provide good credit terms because China has an excellent credit rating. Of the \$1.3 billion worth of complete plants purchased in 1973, more than \$760 million is financed by suppliers' credits at an annual interest rate of around 6%. Similarly, about \$550 million of the \$844 million worth of plants contracted for in 1974 is being financed under medium-term credits. Contracts in both years generally call for payment to begin after all equipment and machinery are delivered. This provision postpones payment for one or two years and extends the repayment period into the 1980s.

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### Locations of Imported Plants

23. Most of the imported plants are concentrated near existing industrial centers at Peking, Shanghai, Shen-yang, and in the Szechwan Basin.<sup>3</sup> The new complexes are located on flat, accessible terrain near good transportation facilities. Several of the new plants are being erected in marginal agricultural areas to conserve land that is more suitable for cultivation. One industrial site south of Shanghai, for example, is on reclaimed land on the edge of a bay and part of another site is on a filled-in swamp.

### *Petrochemical Complexes*

24. China is building four regional petrochemical complexes that will receive all 43 imported chemical plants. One complex is located near the existing Fang-shan Petrochemical Complex southwest of Peking. A pipeline was recently completed to supply Ta-ch'ing crude to this complex. A second petrochemical complex is under construction at Chin-shan-wei, 60 miles southwest of Shanghai on the northern shore of Hang Chou Bay. This complex will be supplied with crude by small coastal tankers. The huge 16-plant French petrochemical complex will be built at Liao-yang 35 miles south of Shen-yang in Manchuria. The fourth imported petrochemical complex is located at Hsia-chu-chai-pa on the eastern edge of the Szechwan Basin about 60 miles northeast of Chungking.

### *Ammonia-Urea*

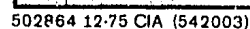
25. The 13 ammonia-urea plants are being built near natural gas or oil fields (for feedstocks) located in major agricultural regions. Three complexes are under construction in the Szechwan Basin, which contains China's largest natural gas deposits. Another plant is under construction southwest of Wu-han along one of Central China's north-south trunk rail lines. Other fertilizer plants are under construction in the coastal plains near the Sheng-li, Te kang, and Pan-shan oilfields. These plants are all served by trunk rail lines. Another plant will be built at the Ta-ch'ing oilfield in northern Manchuria. The French will reportedly build three ammonia-urea complexes, two near Nanking and one east of Canton. The Japanese may build one of their two fertilizer plants near Peking.

3. See Appendix A and the map.

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### *Steel Plants*

26. Imported steel facilities will be added to the existing iron and steel plant at Wu-han. The new steel rolling mills have relatively large finished steel capacities - 3 million tons of hot strip and 1.1 million tons of cold rolled - as does the 1.5 million ton continuous casting mill. Completion of these installations will make Wu-han the most advanced finished steel producer in China.

### *Electric Powerplants*

27. Most of the imported powerplants will likely be located in the heavily industrialized north and northeast plains, an area that has little hydroelectric power. Italy and Japan are building six generating units in the Peking - Tientsin - Ch'in-huang-tao triangle in the heart of the northeast grid. When completed in 1976-77, these six units will contribute more than 690 mw of electricity to the national grid. Four more units are being supplied by French and Japanese companies to serve the Shanghai area, two of which will provide power to the petrochemical complex under construction south of Shanghai. A large thermal powerplant, sold by the French, may also be built in the northeast near Ch'in-huang-tao.

### *Construction Status*

28. As a group, petrochemical plants are in the most advanced stage. About half of the 11 plants at Chin-shan-wei are externally complete, and three plants have reportedly been tested. The large ethylene plant at Fang-shan will begin testing in October, and full-scale operations are set for December. Equipment deliveries have been completed at one other Fang-shan plant, which is also on schedule. Construction at Laio-yang began in December 1974, but agreement on technical documents and final construction details had not been reached with suppliers as of May 1975. Only ground clearing had started in June 1975 at the vinylon plant site in Szechwan.

29. Suppliers have been shipping equipment for ammonia-urea plants since November 1974. The ammonia-urea complexes in the Szechwan Basin are proceeding rapidly, with most large pieces of equipment in place; the first imported plant is scheduled to begin test operations in December. An earthquake earlier this year, however, delayed construction efforts on the Pan-shan plant in southern Manchuria. Resident engineers and construction supervisors who are on the sites of four of the 13 complexes report that construction thus far is on schedule.

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30. The steel rolling mills, in an early stage of construction, should be completed on time in 1977. Delivery of foundation materials and erection equipment began in April this year. Work also has started on the Chinese-designed basic oxygen furnaces located at the Wu-han site. Similarly, thermal powerplants apparently are on schedule. Two of the six plants have been completed externally, and two more have one of two generating sets installed and probably ready for testing.

#### Foreign Technicians

31. The large number of imported plants, their physical complexity, and the sophisticated technology involved have brought a host of foreign technicians into China, and many more are on the way. More than 3,000 technicians and dependents will probably arrive in China over the next two or three years. Large numbers of Westerners will reside in areas of China where foreigners have not been for years, as shown in the rough tabulation, by nationality, of foreign technicians scheduled to serve in China.

Total	3,355
American	250
British	25
French	1,000
German	230
Japanese	1,850

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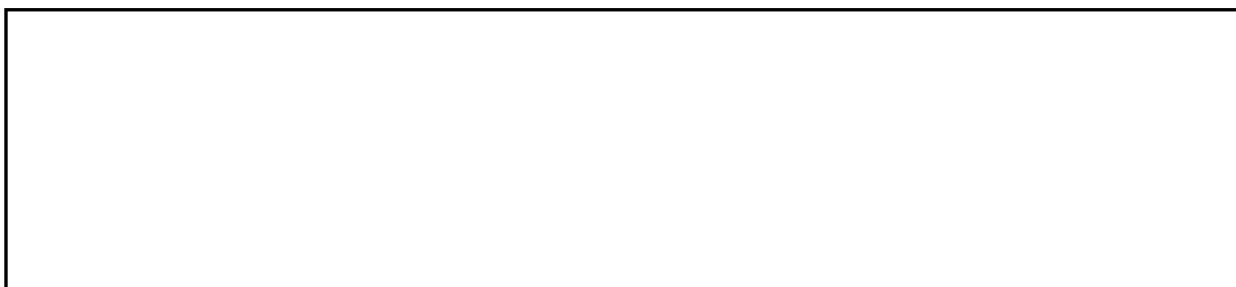
#### Chinese Technicians

33. One of the most beneficial effects to China of the recent plant import program is the training to be given Chinese technicians and managers by foreign suppliers. At least 750 Chinese technicians, operators, engineers, and maintenance personnel are scheduled to be trained abroad under existing contracts. The total may go above 1,000 when all contracts are completed. Of the 750 Chinese trainees, 260 are scheduled to be trained in Japan under the contract for a hot strip mill. By August 1975, more than 50 technicians had been trained in the United States to run ammonia-urea plants. Additional Chinese engineers and specialists have been sent to the plants of manufacturers to inspect and approve equipment prior to shipping.

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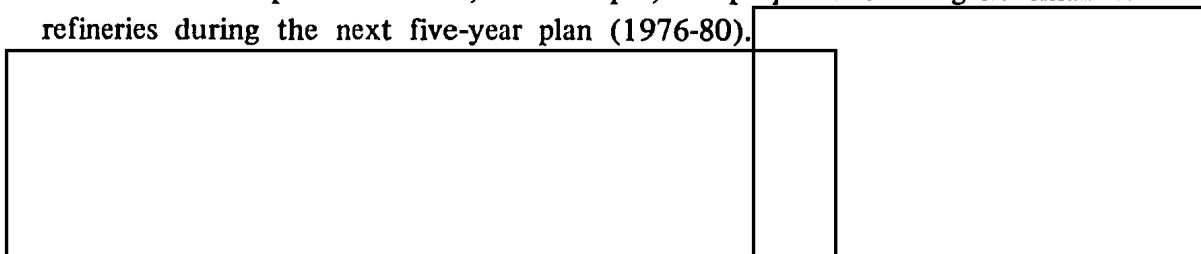
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### Future Plant Purchases

35. The types of plants under negotiation in 1975 reveal China's continuing interest in development of large-scale petrochemical and metallurgical industries.<sup>4</sup> Negotiations are under way for plastics and synthetic rubber plants and for copper and aluminum smelters. The petroleum industry also has a high priority for continued development. France, for example, has proposed building 26 small oil refineries during the next five-year plan (1976-80).



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4. For a list of plants under discussion between China and non-Communist countries, see Appendix C.

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## APPENDIX A

## Confirmed Industrial Plant Purchases, 1972-75

Nation/Firm	Type	Capacity	Million US \$	Contract Signed	Planned Completion	Location and Status
<b>1972</b>						
<b>Japan</b>						
Kobe Steel.....	Air separation plants (17)	Various: large, medium, small	22.7	Jun	1972-75	Larger plants are associated with steel mills.
Hitachi.....	Thermal powerplants (2 units)	135 mw	14.6	Aug	Apr 1974	Shanghai. Completed mid-1974.
<b>Italy</b>						
GLE.....	Thermal powerplant	125 mw	8.8	Sep	May 1974	Peking. Completed in late 1974.
<b>France</b>						
Air Liquide.....	Air separation plants (4)	Small	11.7	N.A.	N.A.	Unknown.
<b>1973</b>						
<b>Japan</b>						
Toyo Engineering.....	Ethylene	300,000 MT/Yr	49.4	Jan	1978	Peking (Fan-shan). Test operations set for October 1975 and full-scale operations for December 1975.
	Butadiene	45,000 MT/Yr				
	Propylene	175,000 MT/Yr				
Mitsubishi.....	Ethylene	120,000 MT/Yr	36.9	Feb	Oct 1975	Shanghai (Chin-shan-wei). Externally complete; equipment deliveries completed March 1975.
Asahi Chemical.....	Acrylonitrile monomer	50,000 MT/Yr	30.4	Mar	1976	Shanghai (Chin-shan-wei). Externally complete, but equipment not all shipped by July 1975.
Kuraray.....	Vinyl acetate	200 MT/Da	26.2	Mar	1976	Shanghai (Chin-shan-wei). Externally complete, June 1975.
Toyo Engineering.....	Ammonia	1,100 MT/Da	41.8	May	N.A.	Peking. Equipment deliveries began May 1975.
Mitsui.....		1,760 MT/Da				
Toatsu.....	Urea					
Toray Engineering.....	Polyester chips	25,000 MT/Da	49.4	May	1976	Shanghai (Chin-shan-wei). This plant may already have been tested.
Mitsui Shipbuilding.....						
Sumitomo Chemical.....	Benzene	100,000 MT/Yr	5.3	May	N.A.	Shanghai (Chin-shan-wei). This plant may already have been tested.
	Toluene	64,000 MT/Yr				
	Xylene	74,000 MT/Yr				
Mitsubishi Petrochemical..	Polyethylene (low density high pressure)	60,000 MT/Yr	22.2	Jul	Sep 1975	Shanghai (Chin-shan-wei). Externally complete. Plant reportedly ready for start-up in August 1975.
Hitachi.....	Powerplants (2 units)	250 mw	71.7	Sep	1975	T'ang-shan, Hopeh. Equipment deliveries began November 1974. Construction in early stages.
Toyo Engineering.....	Ammonia	1,000 MT/Da	43.0	Sep	1975	Wang-chu-chuang, Shantung. Construction in mid-stages as of August 1975.
	Urea	1,600 MT/Da				
Sumitomo Chemical.....	Polypropylene (high pressure low density)	180,000 MT/Yr	39.6	Sep	1976	Peking (Fang-shan). Final shipment of equipment in July 1975. Company inspectors went to China to investigate problems with equipment that was made in United States.

National/Firm	Type	Capacity	US \$	Signed	Completion	Location and Status
1973 (Continued)						
Japan (Continued)						
Toray Engineering.....	Polypropylene	80,000 MT/Yr	25.0	Oct	1976	Shanghai (Chin-shan-wei). Testing began in May 1975; trial start-up set for August 1975.
Mitsui Petrochemical.....						
Toho Titanium.....	Polypropylene catalyst	220 MT/Yr	4.7	Oct	1975	Peking (Fang-shan). Equipment shipped in May 1975.
Nisso Petrochemical.....	Ethylene glycol	60,000 MT/Yr	15.0	Dec	Mar 1977	Peking (Fang-shan) Foundation materials sent April 1975. Final equipment scheduled for August 1975.
	Ethylene oxide	50,000 MT/Yr				
France						
Alsthom.....	Thermal powerplant (2 units)	150 mw	12.4	Jan	1976	Shanghai area. Equipment deliveries began in August 1974 and were continuing in April 1975.
Speichem.....	Vinyl acetate methanol	90,000 MT/Yr	90.0	May	1976	Hsia-chu-chia-pa, Szechwan, 60 miles north-east of Chungking. Equipment deliveries began May 1975. Company representatives and dependents to arrive in China for one year in April 1975. Only ground clearing observed in June 1975.
Speichem and Technip....	Petrochemical complex 16 plants:		300.0	Oct	1977-78	Liao-yang, Liaoning. Construction began in March 1975 and will be completed over 5 years.
	Nylon	45,000 MT/Yr				
	Polyester	60,000 MT/Yr				
	Plastics	120,000 MT/Yr				
United States						
Kellogg.....	Ammonia (3 plants)	Each 1,000 MT/Da	75.0	Mar	1976	US and Netherlands Plants: 1. Na-hsi, Szechwan. Equipment deliveries began November 1974; construction in late stage in August 1975. 2. Wo-li-tun, Heilungkiang. Equipment deliveries began in January 1975; construction in mid-stage in September 1975. US construction engineer arrived in April 1975. 3. P'an-shan, Liaoning. Equipment deliveries began November 1974. Construction in mid-stage in September 1975, but delayed slightly by effects of early 1975 earthquake. 4. T'ang-chou, Hopeh. Construction in mid-stage in September 1975. 5. Shiu-fu, Szechwan. Construction in early stage in January 1975. 6. Ch'ih-shiu, Szechwan. Construction in early stage in September 1975. 7. Yueh-yang, Hunan. Construction in early stage in September 1975. 8. Unlocated.
				Jun	1976	
				Jun	1976	
Kellogg.....	Ammonia (5 plants)	Each 1,000 MT/Da	130.0	Nov	1976-77	

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## APPENDIX A

## Confirmed Industrial Plant Purchases, 1972-75 (Continued)

Nation/Firm	Type	Capacity	Million US \$	Contract Signed	Planned Completion	Location and Status
<b>Netherlands</b>						
Kellogg Continental.....	Urea (3 plants)	Each 1,620 MT/Da	34.0	Feb	1976	
Kellogg Continental.....	Urea (5 plants)	Each 1,620 MT/Da	55.0	Sep	1976-77	
<b>United Kingdom</b>	Film processing	100 million linear ft/Yr	8.3	Jul	1976	Peking. No other details available.
<b>West Germany</b>						
Udhe & Hoechst.....	Acetaldehyde	30,000 MT/Yr	5.3	Jul	1976	Shanghai (Chin-shan-wei). Equipment deliveries began December 1974. Company representatives on site in May 1975. Catalysts sent in May 1975.
<b>Sweden</b>						
Defiber.....	Pulp mill	150 MT/Da	4.3	Nov	N.A.	Manchuria. No other details available.
<b>Italy</b>						
GIE.....	Oil-fired thermal powerplant (2 units)	320 mw	79.0	Nov	1975-76	Tientsin. Equipment deliveries began December 1974. Italian technician, reportedly went to the plant site in May 1975.
<b>Denmark</b>						
Haldor Topsoe.....	Ammonia catalyst for fertilizer plants	N.A.	13.0	Dec	N.A.	Unlocated but will be built near Nanking; this plant will supply catalysts for French-designed urea plants.
<b>1974</b>						
<b>Japan</b>						
Asahi Chemical.....	Acrylonitrile waste treatment	44,000 MT/Yr	4.2	Jan	1975	Shanghai (Chin-shan-wei). Externally complete. Company representatives working on flow problems in August 1975.
Niigata Engineering.....						
Teijin.....	Polyester spinning	10 MT/Da	16.0	Jan	N.A.	Shanghai (Chin-shan-wei). Progress delayed by Chinese design changes. Foundation materials and special tools sent May 1975.
Nisso Engineering.....	Polyester fiber	N.A.	13.5	Mar	1975	Peking (Fang-shan). Equipment to be delivered by the end of 1976. No other details available.
Nippon Steel.....	Hot strip rolling mill	3 million MT/Yr	228.5	Jun	1977	Wu-han. Anchor bolts, cranes, erection equipment sent in June 1975. In early stage of construction as of July 1975.
	Silicon plate mill	70,000 MT/Yr				
Nippon Steel.....	Equipment for hot strip mill	1,700-mm rollers	65.0	Oct	1977	
Kuraray.....	Vinylon	45,000 MT/Yr	18.1	Oct	Jul 1976	Hsia-chu-chai-pa, Szechwan, 60 miles north-east of Chungking. Only ground clearing observed in June 1975. Equipment delivery of foundation materials began May 1975.

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<b>West Germany</b>						
Uhde.....	Vinyl chloride	80,000 MT/Yr	19.0	Jan	Sep 1976	Peking (Fang-shan). Foundation materials sent December 1974; equipment deliveries scheduled from March 1975 to November 1975.
Demag:						
Schloemann-Siemag.....	Cold rolling mill	1.1 million MT/Yr	200.0	Mar	1977	Wu-han. In early stage of construction as of July 1975.
Uhde.....	Polyethylene (high density)	25,000 MT/Yr	15.0	Mar	1977	Liao-yang, Liaoning. Company representatives arrived in China in April 1975.
Demag:						
Schloemann-Siemag.....	Continuous casting mill	1.5 million MT/Yr	57.0	Aug	Spring 1977	Wu-han. Foundation materials, anchor bolts, etc., sent June 1975.
Brown Boveri.....	Auto compensation substation power relay (2 units)	....	4.7	Aug	1977	Probably Wu-han. This substation is probably associated with the steel mills.
<b>France</b>						
Huerty.....	Ammonia (3 plants) Urea (3 plants)	1,000 MT/Yr 1,700 MT/Yr	120.0	Feb	1976-77	1. Kuang-chou, Kwangtung. Construction in early stage in September 1975. 2. Nanking. Construction in early stage in September 1975. 3. An-ch'ing, Anhwei. Construction in early stage in September 1975.
CEM and BBC.....	Lignite fuel thermal powerplant	300 mw	53.8	Feb	1976	T'ang-shan, Hopeh. No details available.
Rhone-Poulenc.....	Nylon spinning	N.A.	10.4	Aug	1977	Liao-yang, Liaoning. Equipment deliveries delayed for 2 months by Chinese modifications in piping systems. Construction scheduled to begin in 1977 and to be completed in 1978.
<b>Italy</b>						
Snam Progetti.....	Polypropylene	35,000 MT/Yr	16.0	Jan	1978	Liao-yang, Liaoning. Only early site clearing observed in December 1974.
<b>Sweden</b>						
Asea.....	Ladle furnaces (2 units)	100 MT and 30 MT sizes	3.2	Aug	1975	Probably in Wu-han. These furnaces are used to refine steel. No other details available.
Esabes.....	Anchor chain	N.A.	N.A.	Nov	1976	Unlocated. Details of contract still under discussion as of June 1975.
<b>Jan-Sep 1975</b>						
<b>Japan</b>						
Nippon Seiko.....	Spherical bearings	210 JO/Yr	3.1	Apr	Oct 1976	Lo-yang, Honan. No equipment shipped as yet.
Koyo Seiko.....	Cylindrical bearings	200,000-300,000/Yr	7.6	Apr	{ Spring 1976 1976	Ha-erh-pin, Heilungkiang. No equipment shipped as yet.
Koyo Seiko.....	Railroad bearings	65,000/Yr				Peking. No equipment shipped as yet.
Three Japanese firms.....	Laminated board	N.A.	N.A.	Sep	N.A.	Unlocated. No details available as yet.
<b>West Germany</b>						
Rheinstahl-Wagner.....	"VRN-40"	N.A.	N.A.	Aug	N.A.	Unlocated. No details available as yet.
Linde.....	Benzene	100,000 MT/Yr	20.6	Sep	1978	Will probably be located at Peking (Fang-shan). No other details available.

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## APPENDIX B

## List of Plants Involving US Technology

Nation/Firm	Type of Plant
<b>1973</b>	
<b>Japan</b>	
Toyo Engineering.....	Ethylene, Butadiene, Propylene
Asahi Chemical.....	Acrylonitrile monomer
Toyo Engineering.....	Ammonia/Urea
Toray Engineering and Mitsui Shipbuilding.	Polyester chips
Sumitomo Chemical.....	Benzene, Toulene, Xylene
Nisso Petrochemical.....	Ethylene glycol, Ethylene oxide
<b>France</b>	
Speichem.....	Vinyl acetate, Methanol
Speichem and Technip.....	Three chemical plants of 16-plant petrochemical complex at Liao-yang.
<b>Netherlands</b>	
Kellog Continental.....	Urea
<b>United Kingdom</b> .....	Film processing
<b>1974</b>	
<b>Japan</b>	
Asahi Chemical and Niigata Engineering.	Acrylonitrile waste treatment
Nippon Steel.....	Hot strip rolling mill
<b>West Germany</b>	
Uhde.....	Vinyl chloride monomer
<b>Italy</b>	
Snam Progetti.....	Poiypropylene
<b>Jan-Sep 1975</b>	
<b>Japan</b>	
Koyo Seiko.....	Cylindrical bearings
<b>West Germany</b>	
Linde.....	Benzene

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